

The Echinoderm Newsletter¹

No. 2. August, 1969

Prepared in the Division of Echinoderms, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560 U.S.A.

The response to the Echinoderm Newsletter No. 1 was encouraging. We mailed 200 copies, and received more than 100 replies. Those who did reply were strongly in favor of the venture, and this was a source of encouragement. We realize that several specialists who have not as yet replied to the questionnaire may have forgotten to do so and we would like to urge that they reply as soon as possible, so that information on their current projects and publications can be included in Newsletter No. 3.

We regret the delay in producing this issue, and fondly hope that No. 3 will not have such a difficult birth as did No. 2. Future issues of the Newsletter will probably be organized in a similar way to this one, but we hope to add a new section with the title "Research Notes" in which short paragraphs contributed by you can be included. Why not send us a contribution now?

Included with this Newsletter is a directory of echinoderm specialists. The list comprises more than 300 names, and is growing rapidly. Please notify us of any changes or corrections so that they can be incorporated into the next Newsletter. The Newsletter has a wide circulation, and you can be sure that your research notes, offers, requests, etc., will reach a wide and interested audience.

David L. Pawson
Maureen E. Downey

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The Echinoderm Newsletter is not part of the scientific literature, and should not be cited, abstracted, or reprinted as a published document.

Zoological Record

Miss Ailsa Clark of the British Museum (Natural History) has sent us the following information on the Zoological Record: - 'I would like to start by making an apology for the lengthening time lag between year's end and the appearance of the appropriate part of the Record, which is now well over 18 months. The ever increasing volume of literature received by the libraries, together with the shortage of Searchers to scan every publication and write the author slips for the individual Recorders to consult and analyze, means that a significant proportion of the literature is not brought to my attention until over 12 months after publication. (Add to this some dilatoriness on my own part in completing the basic writing up so that the sorting of the subject and systematic sections is lately deferred to my Easter holiday, rather than the preceding Christmas, and the delay is enhanced.) The other sections are in much the same state and it would not help to hand over the Echinoderm Section to the full-time recorders, who are even more behind with most sections owing the progressive reduction in the number of part-time workers discouraged by the increasing size of the job. It would help a lot if more people would send a copy of their papers to me as requested in the first Newsletter and I am very grateful to those who have already responded to this; there is so much competition for our library copies from museum staff as well as from the other Recorders, apart from withdrawal for book-binding at crucial times, that inevitably some papers have to be deferred beyond their proper year of entry.

The Record itself has grown so much that I am considering drastically reducing the entries in the subject index as far as experimental physiology and embryology go, since in many cases the titles of the papers give sufficient clue to their contents and the use of echinoderms as raw material is often mainly incidental. I propose to do this, reverting to the pre-1954 format, from the 1968 number, unless a significant number of interested parties write to request continuation of the present amount of detail; after all the Record is intended to cater mainly for systematists. If anyone else has comments or improvements to suggest (without significantly increasing the labor involved), I would be very interested to hear from them.

Ailsa Clark, British Museum (Nat. Hist.), Cromwell Rd., London, S.W.7,
England

Current Research Projects

- Carol Wagner ALLISON - monographic study of Eastern Pacific fossil and extant echinoids, particularly description and study of growth dynamics of several genera of sand dollars.
- John M. ANDERSON - continuing study of morphological/histological details of the gut of Oreaster.
- George S. ARAKI - investigations on intracellular digestion in Patiria miniata.
- Yurii Andreevich ARENDT - studies of Late Jurassic and early Cretaceous crinoids of Crimea.
- Patrick M. ARNAUD - Ecology, biogeography and systematics of Antarctic and Subantarctic echinoids, asteroids and ophiuroids, with research on diet and reproductive problems.
- Alan N. BAKER - survey of echinoids from sublittoral, shelf and slope of northern New Zealand. Study of brood protection in New Zealand species of Goniocidaris.
- Bruce McConnell BELL - Edrioasteroidea: functional morphology, taxonomy, phylogeny, development, population dynamics and paleo-ecology.
- George M. BELYAEV - abyssal and hadal holothurians and asteroids; review of the genus Elpidia (Holothuroidea) collected from deep-sea trenches by various Soviet expeditions
- Jacques BERGER - physiology of the gut of echinoids; electron microscopy and general biology of entocommensal ciliates of echinoids.
- E. John BINYON - electrophysiology of asteroid nervous systems; adaptation to reduced salinity by asteroids.
- Charles BIRKELAND - ecology of the Solasteridae; feeding strategy of various asteroid predators of Ptilosarcus.
- Daniel B. BLAKE - asteroid ossicle morphology and evolutionary implications.
- R.A. BOOLOOTIAN - a series of films on echinoderm biology are being prepared; one nearing completion is "aspects of hemal physiology", another is "the echinoderm".

- Jon W. BRANSTRATOR - re-examination of early Paleozoic "Palaeasters", including an attempt to work out ontogenies.
- James C. BROWER - crinoid fauna of Girardeau Limestone (Upper Ordovician); includes study of anatomy and taxonomy, functional morphology, paleoecology, ontogeny and evolution. Quantitative methods as applied to growth and taxonomy.
- John J. BURKE - continuing study of Pennsylvanian crinoids of the Allegheny region.
- Andrew C. CAMPBELL - physiology of pedicellariae; fine structure of pedicellariae; ecology of Acanthaster planci in the Red Sea.
- A.B. CHAET - neuroendocrinology and the release of gametes by sea stars.
- Louise G. CHATLYNNE - electron microscopy of ovaries of Strongylocentrotus purpuratus.
- Jean CHAUVEL - revision of the cystoids and carpoids of the Massif armoricain; continuing study of the echinoderms of the Ordovician marocain.
- Richard CHESHER - systematic analysis of Antarctic echinoids; biology of Acanthaster planci; long term population changes of tropical echinoids.
- Fu-Shiang CHIA - reproductive cycle of Asterias rubens; effect of testosterone and natural extract on gametogenesis in A. rubens; brooding biology of Henricia sanguinolenta; structure and function of echinoid pedicellariae; autoradiographic studies of assimilation of dissolved organic particles by echinoderms larvae.
- Ailsa M. CLARK - monograph of shallow Indo-West-Pacific echinoderms has just been completed; current studies include a revision of the Scandinavian crinoids.
- Helen E.S. CLARK - revision of asteroids of Antarctica and the Southern Oceans.
- James F. CLARK - echinoderms from a transect of the Peru-Chile Trench; crinoids, ophiuroids, and asteroids of Madagascar.
- James L.S. COBB - various aspects of the fine structure and physiology (including intra-cellular recording) of echinoderms.
- Barbara Ann COCANOUR - correlation of growth and reproduction in Echinarachnius parma.

- Pierre COUILLARD - physiology of fertilization and first cleavage in Strongylocentrotus droebachiensis and Echinarachnius parma.
- Robert W. CRIPPEN - polychaetous annelids as commensals on echinoderms.
- Robin G. CRUMP - reproduction, feeding and growth in two asteroids, Patiriella regularis and Coscinasterias calamaria.
- Bertha M. CUTRESS - manuscripts in preparation on Cretaceous to Recent Cidaroida of the Caribbean and U.S. Eastern and Gulf states.
- A.J. DARTNALL - systematic studies of the asteroid genus Patiriella; comparative studies on reproduction of asterinids; comparative histology of stomach and feeding methods of asterinids.
- Paul K. DAYTON - tropic relation of solasterid asteroids in the north-eastern Pacific; energetics and behavior of Parastichopus californicus; some effects of Strongylocentrotus purpuratus and Pycnopodia helianthoides predation.
- John H. DEARBORN - Ctenodiscus ecology; systematics of some Antarctic crinoids and ophiuroids; examination of echinoderms collected from Davis Strait-Labrador Sea area collected August, 1968 by R/V HERO.
- Richard DEHM - cystoids, blastoids and echinozoans from the Lower Devonian Bundenbach states, West Germany.
- Dennis M. DEVANEY - Systematics of Chilophiurida; development of shallow water Panamanian ophiuroids.
- Trevor G. DIX - movements, reproduction, age, growth and size, variation, feeding, covering response of Evechinus chloroticus.
- Jose S. DOMANTAY - continuing research on echinoderms (particularly holothurians) of the Philippines area.
- Gabrielle DONNAY - crystallography of echinoderm skeletal elements (with David L. PAWSON).
- Maureen E. DOWNEY - catalog of type specimens of asteroids in major U.S. collections; revision of asteroids of the Gulf and Caribbean area.
- Cecilia E. DULUK - ontogeny of the crinoid Gilbertsocrinus in the Silica Formation (Devonian) of Ohio (with Harrell L. STRIMPLE).
- J. Wyatt DURHAM - monograph (with Carol Wagner ALLISON) of Cretaceous and Cenozoic echinoids of western north and central American region; description of new Ordovician Rhipidocystoid from Maryland; Tertiary echinoids of Chiapas, Mexico; detailed description of helicoplacoids.

- Robert DELAVALT - sexuality of Echinaster sepositus.
- Thomas A. EBERT - distribution and abundance of regular sea urchins along the Kona coast of Hawaii; growth rates of Echinometra mathaei and E. oblonga, Colobocentrotus and Echinothrix diadema; an iterative solution for instantaneous mortality given a size distribution and growth rate.
- Robert ENDEAN - study of Acanthaster planci populations on reefs of Great Barrier Reef; new records of echinoderms in Queensland waters.
- Norman A. ENGSTROM - live history and embryology of three shallow water aspidochirotid holothurians.
- Robert Gary ERNEST - systematics and ecology of echinoderms in Tampa Bay, Florida.
- A. FARMANFARMAIAN - mechanism of intestinal absorption and transport of sugars in echinoderms.
- Robert O. FAY - Bromide echinoderms - Bromide Formation (Paleozoic), Oklahoma.
- Hubert FECHTER - echinoderms collected by the METEOR; protein electrophoresis in echinoderms as a systematic tool.
- Howard FEDER - search for specific substances responsible for avoidance reactions in various organisms to contact by predatory sea stars, including study of behavior involved; food and feeding of the ophiuroid Ophiura texturata.
- F. Julian FELL - echinoids collected from the Southern Pacific by the R/V ANTON BRUUN.
- A.R. FONTAINE - functional morphology of the ophiuroid gut; metabolic storage in ophiuroids; insulin secretion in asteroids; mucous secretions in ophiuroids; properties of ophiuroid ganglion cells.
- Akira FUJI - population structure and energy flow in Japanese sea urchins.
- Abelardo GERONIMO - ophiuroids and holothurians of Mariveles and vicinity (outside Manila Bay, Philippines).
- Arthur C. GIESE - body wall physiology and biochemistry of echinoids, with plans to compare temperate and Antarctic forms.
- John GRAHAM - continuing study of distribution of echinoderms off North Otago coast, New Zealand.
- Alain GUILLE - catalog of echinoderms of the Mediterranean and ecological studies.

- Jerald HALPERN - monograph of the Goniasteridae of the tropical Atlantic; feeding and embryology of Oreaster reticulatus; growth of Luidia senegalensis.
- Bent HANSEN - elaspodid holothurians collected by the GALATHEA Expedition 1950-1952.
- Hans HESS - Middle Jurassic echinoderm fauna from the Swiss Jura (includes 5 new asteroids, 2 new echinoids, one of which is a primitive echinothuriid).
- John H. HIMMELMAN - Strongylocentrotus droebachiensis: population dynamics, gonad cycle, effects of grazing upon algae.
- Alan HOROWITZ - redescription of the 33 species of the Mississippian camerate crinoid genus Pterotocrinus Lyon and Casseday.
- Frederick H.C. HOTCHKISS - review and revision of North American Ordovician ophiuroids.
- Seiichi IRIMURA - systematic studies of the ophiuroids of Japan.
- D.B. JAMES - systematic studies of the echinoderms of India.
- R.P.S. JEFFERIES - anatomy of the mitrate Placocystites forbesianus de Koninck.
- A. John JORDAN - ecology and active movements of holothurians of Maine Coast.
- Haruo KANATANI - mechanisms of oocyte maturation in starfish.
- Robert V. KESLING - study of tegminal spines in some species of Gilbertsocrinus; study of new ophiuroid from Middle Devonian Silica Shale of Ohio.
- Porter M. KIER - Mesozoic and Tertiary echinoids of Saudi Arabia; evolution of the lantern in echinoids; disintegration of echinoid tests after death.
- Nayomasa KOBAYASHI - histochemistry of oogenesis of sea urchins; physiology of reproduction of sea urchins.
- S. KRISHNAN - nutritional transport in holothurians, with special reference to proteins, carbohydrates and lipids.
- Michael A. KYTE - Ophiuroidea and Holothuroidea in deep-sea environments of Oregon, U.S.A. (with Andrew G. CAREY).
- D. LANDENBERGER - predatory behavior of starfish.
- N. Gary LANE - paleoecology of Crawfordsville (Indiana) crinoid beds; community and organic evolution of Upper Osagian - Lower Meramecian crinoids in west-central Indiana.

- M.S. LAVERACK - anatomy, fine structure and physiology of echinoderm sense organs.
- John M. LAWRENCE - comparative study of the ultrastructure of the gut of sea urchins.
- José Santiago LIMA-VERDE - inventory of echinoderm fauna of Northeast Brazil; preparation of keys, biological and ecological notes on the fauna of the area.
- Prasert LOHAVANIJAYA - is collecting echinoderms (chiefly echinoids and asteroids) for the Thai National Reference Collections.
- George C. MCINTOSH - Devonian crinozoans; graduate study at University of Michigan.
- Donald B. MACURDA - phylogeny of fissiculate blastoids; ontogeny and functional morphology of the blastoids of the Burlington limestone; Permian orinoids of Western Australia; Mississippian blastoids of Alaska.
- Dietrich B.E. MAGNUS - feeding behavior of crinoids and ophiuroids; partnerships and symbioses between echinoderms and other animals.
- Karl P. MAUZEY - feeding and reproductive cycles of Paracentrotus lividus near Beirut, Lebanon.
- Bruce MENGE - ecology of Leptasterias hexactis; co-worker on energetics of Parastichopus californicus.
- David Lachlan MEYER - functional morphology and autecology of shallow water crinoids of the Caribbean Sea; evolution of Paleozoic crinoid community structure; feeding biology of flexible crinoids.
- Simon A. MILEIKOVSKY - reproductive ecology of Echinodermata; aggregation of echinoderms; distribution of larvae in Boreal regions.
- Norman A. MILLOTT - axial organ of echinoids.
- Leigh W. MINTZ - study of paracrinoids (in collaboration with Ronald PARSLEY); disasteroid echinoids; crinozoans.
- Chitaru OGURO - development of the apodous holothurian Scoliodotella uchidai.
- Katsuhiro OKADA - histology of poisonous pedicellariae of Toxopneustes pileolus.

- Dorothy PATENT - Gorgonocephalus embryology, gonad histology, life cycle.
- Christopher R.C. PAUL - revision of North American "Holocystites" fauna; functional morphology of exothecal pore-structures; paleoecology of Strobilocystites.
- David L. PAWSON - systematics of Antarctic and Australian holothurians; X-Ray diffraction studies of echinoderm skeleton (with Gabrielle DONNAY); "natural history" of deep-sea holothurians, using seafloor photographs.
- John S. FEARSE - completing work on reproductive periodicities of Indo-Pacific invertebrates in Gulf of Suez; detailed analysis of gametogenesis in Strongylocentrotus purpuratus.
- Raymond E. PECK - microcrinoids (Saccocoma) from Cretaceous of Gulf Coast,
- Thomas F. PHELAN - studies on cidaroids of Western Atlantic; echinoids of coastal U.S.A.
- G.M. PHILIP - Australian Cainozoic echinoids; Paleozoic crinoids.
- Elisabeth C. POPE - reviewing collections of Australasian and Coral Sea echinoids and asteroids, with plans to prepare a paper; starfishes of Fiji (with Loisette MARSH).
- Rudolf J. PROKOP - Crinoidea of the Family Symbathocrinidae in the early Paleozoic of Bohemia.
- Gerhard REGNELL - pelmatozoans from the Ordovician of Girvan, Scotland; cystoids from Tramore Limestone (M. Ordovician), Ireland; studies on Bolboporites; Middle Devonian Eucystis from France.
- Boon Jo RHO - Studies on Echinodermata (excluding Holothuroidea) collected around South Korea since 1966.
- Richard A. ROBINSON - (with James SPRINKLE) describing a new class of Homalozoa from Middle Cambrian of Utah.
- Janis A. ROMMEL - Asteroids from ANTON BRUUN Cruises 12 and 13; zoogeography of Antarctic crinoids.
- Amy SCHOENER - feeding habits of ophiuroids; population structure of shallow water tropical and deep-sea ophiuroids.

Donald Keith SERAFY - echinoderms collected by Project Hourglass (systematic sampling program in eastern Gulf of Mexico to depths of 4 fathoms).

George D. SEVASTOPULO - Carboniferous and Silurian crinoids of Britain and Ireland; Paleozoic Micropelmatozoa (with H.L. STRIMPLE); recent comatulids of East Africa.

Scoresby A. SHEPHERD - ecology and distribution of Australian crinoids, ophiuroids and echinoids.

Helene SOUZA SANTOS - identification of lysosomes in the epithelial layer of tube feet of asteroids.

D.G. STEPHENSON - variation in the apical disc of Conulus albogalerus; spines of irregular echinoids from The Chalk (England); echinoids from the Mesozoic of Tanganyika.

Robert B. STOKES - geographical variations in Micraster from the Chalk of Europe.

Richard STRATHMANN - feeding of echinoderm larvae; behavior and feeding of larvae before and after settling.

Harrell L. STRIMPLE - contributing to Treatise on Invertebrate Paleontology (Crinoidea); crinoids from the LaSalle Limestone, U.S.A. (with Raymond C. MOORE); Pennsylvanian crinoids of Nebraska (with Roger PABIAN); ontogeny of Gilbertocrinus onioensis (with Cecilia DULUK); Lower Golconda crinoids of Illinois and Kentucky (with D.W. BURDICK); Morrowan crinoids of Oklahoma and Arkansas (with Raymond C. MOORE).

Masao SUGIYAMA - fertilization and development of Echinoidea.

Emery F. SWAN - continuing studies on growth in Strongylocentrotus.

Wanda SZYMANSKA - studies on the origin of irregular echinoids.

Keiichi TAKAHASHI - physiological studies on nerves and muscles of echinoids; physiology of spine movement.

Geneviève TERMIER - middle Cambrian Carpoidea of Southern France.

Lowell P. THOMAS - preparing monograph of Western Atlantic amphiuroid ophiuroids for publication.

Luiz Roberto TOMMASI - ophiurans collected by USNS ELTANIN in Antarctic and Subantarctic regions; echinoderms collected by MV OREGON; ecology of echinoderms of Rio de Janeiro State coast, to depths of 2,000 metres; echinoderms of continental shelf off the State of Rio Grande do Sul.

- Georges Jean UBAGHS - preparation of section on camerate crinoids for Treatise on Invertebrate Paleontology, Part T (Crinoidea); study of a new species of Balantiocystis (Eocrinoidea); further studies on mitrate Stylophora.
- Huzio UTINOMI - identification and description of Crinoidea, Echinoidea and Holothuroidea.
- Jon WEBER - fractionation of isotopes of carbon and oxygen in marine invertebrates; spine growth and regeneration in Heterocentrotus trigonarius; revision of the echinoid genera Heterocentrotus and Zenocentrotus; scanning electron microscopy of the echinoid tooth.
- G.D. WEBSTER - Bibliography and Index of Paleozoic crinoids, 1942-1968; Silurian, Mississippian, Pennsylvanian and Permian crinoids of southeast Alaska; Stephanocrinus angulatus Conrad from the Nanbug Beds of Kashmir (with V.J. GUPTA).
- Peter G. WELLS - describing physical and chemical parameters of environment of the entocommensal ciliates of two species of Strongylocentrotus.
- Betty J. WESTERBORG - ecology and taxonomy of the holothurian genus Leptosynapta in the waters of British Columbia.
- James A. WOLLEBEN - lithostratigraphy and clypeasteroid paleontology (Tertiary, southeastern United States); physiology and development of living clypeasteroids in aquaria; observation and experimentation with living clypeasteroids in the Gulf of Mexico.
- Masao YOSHIDA - recording the ocellar potential of Asterias with ultra-microelectrodes.
- George ZAMMIT-MAEMPFL - the significance of abnormal morphological features in some Maltese fossil echinoids.
- Dusan ZAVODNIK - ecology and dynamics of echinoderms in littoral benthic communities; monograph of Adriatic echinoderms.
- Fred C. ZIESENHENNE - Indo-Pacific ophiuroidea.
- Victor A. ZULLO - monographic study of systematics, phylogeny and zoogeography of the Cenozoic spatangoids of the northeastern Pacific.

Late Additions To "Current Research Projects"

Joseph H. BRUMBAUGH - comparative natural histories of Cucumaria curata and C. pseudocurata.

John FERGUSON - feeding, nutrition and amino acid transport in asteroids.

Ronald PARSLEY - monograph of North American Paracrinoids and pleurocystitids.

Galina Alexandrowna STUKALINA - Crinoidea of U.S.S.R.

Jeremy D. WOODLEY - ecology of West Indian brittle stars; water vascular system of Astrophyton, Ophiomyxa; pressure measurements in tube feet of Oreaster.

Title of the Year

We think the prize for Title of the Year should be awarded to Porter M. Kier for: "A cretaceous echinoid with false teeth". In press.

Offers, Requests, etc.

Jacques BERGER will be glad to identify ciliate protozoans from echinoids; he is interested in receiving smear slides of any ciliates from echinoids, especially from the Southern Hemisphere.

R.A. BOOLOOTIAN is producing a series of films on echinoderm biology, designed for use in college level courses on general and invertebrate zoology and developmental biology. These will become available over the next couple of years.

Jon W. BRANSTRATOR would like to know where the types of the G.W. Harper Collection are now housed; he is especially interested in the holotype of Palaeaster clarkana Miller, 1878.

Richard CHESHER now has on commercial microfilm (16 mm) virtually all that has been written on echinoids, including Mortensen (+ monograph), Clark, A. Agassiz, Koehler, etc., and much material on asteroids and ophiuroids. Anyone interested in obtaining copies should write to him for further information.

Bertha M. CUTRESS has for sale the following publications:

Ekman, S. 1925. Holothurien. Further Zool. Res. of the Swedish Antarctic Exped. 1901-03, vol. 1, no. 6. (Paperbound. \$5.00)

Cherbonnier, Gustave. 1951. Holothuries de l'Institut Royal des Sciences Naturelles de Belgique. Inst. Roy. des. Sci. Nat. de Belgique, Mem., ser. 2, fasc. 41. (Paperbound. \$5.00)

Cherbonnier, Gustave. 1952. Les Holothuries de Quoy et Gaimard. Inst. Roy. des Sci. Nat. de Belgique, Mem., ser. 2, fasc. 44. (Paperbound. \$8.00)

Danielssen, D.C. and J. Koren. 1882. Zoologi: Holothurioidea. Den Norske Nordhavs-Exped. 1876-78, pt. 6. (Paperbound; top cover loose. \$7.00)

Fisher, Walter K. 1906. Starfishes of the Hawaiian Islands. Bull. U.S. Fish Comm. for 1903. (Without cover. \$4.00)

Koehler, R. and C. Vaney. 1905. Echinoderms of the Indian Museum: An account of the deep-sea Holothurioidea collected by the... Investigator. Calcutta. (Paperbound. \$9.50)

Ludwig, H. 1894. The Holothurioidea. Harvard Coll., Mus. Comp. Zool., Mem., vol. 17, no. 3. (Hard cover; old leather back and corners. \$9.00)

v. Marenzeller, E. 1893. Contribution a l'etude des Holothuries de l'Atlantique Nord. Résultats des Campagnes Scientifiques accomplies sur son yacht par Albert Ier Prince Souverain de Monaco... Fasc. 6. (Paperbound. \$5.00)

Mitsukuri, K. 1912. Studies on actinopodous Holothurioidea. Jour. Coll. Sci., Imper. Univ. Tokyo, vol. 29, art. 2. (Paperbound. \$7.00).

Alan DARTNALL would like to have details of worldwide holdings of the family Asterinidae, and would appreciate receiving collection data, including given name, locality, date, collector, type material, etc. Such information would materially assist him in the task of revising the group.

Cecilia E. DULUK would like to purchase a preserved specimen of a Recent stalked crinoid. Any offers?

Robert ENDEAN writes as follows - "Acanthaster planci (the crown-of-thorns starfish) has caused immense damage to many reefs of the Great Barrier Reef, Australia. It is hoped that measures to control the A. planci plague will be instituted in the near future. Has anybody any information on population densities of A. planci on coral reefs outside Queensland waters? If so, please contact the undersigned."

Howard FEDER would like to be advised of examples of avoidance responses to predatory sea stars, and the nature of the responses. If your observations are not going to be published, he would appreciate receiving details, so that they might be included in a review article which is now in preparation.

Alan S. HOROWITZ has prepared a checklist of fossil crinoids from the Chester and Ste. Genevieve rocks (Mississippian, Late Visean and early Namurian) in eastern United States. The list contains about 250 names and includes depository and depository numbers of types where known. No literature citations are given.

A second list includes objective synonymies of all species of Pterotocrinus, plus information on type repositories. A third list cites all fossil echinoderms reported from the Chester series of the Illinois Basin. Copies of the lists are on file in the Springer Room and the National Museum of Natural History, Smithsonian Institution.

N. Gary LANE advised us that for the last three years, those interested in fossil echinoderms have held an informal evening meeting at the annual Geological Society of America meetings. A similar session is planned for the Atlantic City meeting in November, 1969.

Leigh W. MINTZ would like to obtain Mesozoic echinoids for the California State College, Hayward. The university is new, with little echinoderm material; expansion of the collections is planned over the next few years.

John S. PEARSE is preparing a review paper on reproduction of echinoderms (all aspects) and would appreciate receiving reprints of recent papers and information on current work which might be included.

G.D. WEBSTER will soon be publishing his bibliography and index of Paleozoic crinoids, 1942-1968. As he intends to bring the index up to date periodically he would appreciate receiving relevant reprints of future publications.

Betty J. WESTERBORG would appreciate receiving information on the distribution of the holothurian Leptosynapta, particularly along the Pacific coast of North America.

George ZAMMIT-MAEMPFL would like to receive reprints of papers relating to abnormalities in Recent and fossil echinoid tests (fascioles, additional plates, ectopic pore pairs, etc.).

Recent Publications and Papers in Press

The following list was extracted from replies to the Newsletter No. 1 questionnaire; thus it is far from complete. No attempt has been made to standardize the literature citations. The entries were copied (in most cases) directly from the reply sheets.

- Achituv, Y. Studies on the reproduction and distribution of Asterina burtoni and Asterina wega in the Red Sea and Eastern Mediterranean. In press.
- Allison, C.W. Echinoids. In: California Intertidal Invertebrates. Stanford Univ. Press. In press. (with J.W. Durham).
- Arendt, Y.A. 1967. Nikolai Nikolaevich Yakovlev. Mat. biogr. a. bibliogr. Sci-s USSR (with R.I. Goriacheva).
- _____. 1967. Blastoids of the genus Orbitremites in Lower Carboniferous of the Moscow region.
- _____, 1968. Pirasocrinids from Krasnouflimsk. Paleont. Journ. 1968, no. 4, p. 99-101.
- _____, 1968. Foreign specialists on fossil Echinodermata visiting the U.S.S.R. Ibid., No. 2, p. 151-152 (with G.A. Stukalina).
- _____, 1968. Regressive and neotenic phenomena in crinoids Hypocrinidae.
- _____, 1968. A new blastoid fauna from the Lower Namurian of North Kazakhstan, U.S.S.R. Koninkl. Nederl. Akad. Wetensch, Amsterdam. Proc. ser. b vol. 71 (3), 159-174. (with A. Breimer and D.B. Macurda)
- _____, 1968. New data on early Cretaceous crinoids of Crimea.
- _____, Contribution to characteristics of Orocrinus. Paleont. Journ. In press (with E.E. Pavlova)
- _____. Blastoids In: "The Great Soviet Encyclopedia". In press.
- _____. Sea lilies - Hypocrinidae. Paleontol. Inst. Akad. Nauk. USSR. In press.
- _____. Rudimentary organs of hypocrinids. Ibid. In press.
- _____. The genus Hypocrinus in Permian deposits of Urals and Timor.

Arnaud, P.M. Bibliographie generale de Biologie antarctique et sub-antarctique. Com. Nat. franc. Rech. ant. Paris, 18, 180 pp. (with F. Arnaud and J.C. Hureau). Includes more than 250 echinoderm references.

_____. Frequency and ecological significance of necrophagy among the benthic species of Antarctic coastal waters. In: Antarctic Ecology, Academic Press, London. In press.

Baker, A.N. 1968. A new cidarid echinoid from northern New Zealand. Trans. R. Soc. N.Z. (Zool.) 1 (21): 199-203, 1 fig.

_____. The echinoid fauna of North-eastern New Zealand. Ibid. (Biol. Sci.) 1 (1); 1-7, 1 pl. In press.

Bell, B.M. and R.W. Frey. Observations on the ecology, feeding and borrowing mechanism of Mellita quinquiesperforata (Leske). Journ. Paleontology. In press.

Belyaev, G.M. 1968. The starfishes (Asteroidea). In: L.A. Zenkevitch (ed.) Life of animals, vol. 2, p. 247-271. Enlightenment Publ. House: Moscow.

_____. Ultraabyssal holothurians of the genus Myriotrochus (Apoda, Myriotrochidae). Trudy Inst. Okeanol. Akad. Nauk. SSSR. In press (In Russian).

_____ and M.E. Vinogradov. A new pelagic holothurian from the abyssal of the Kurile-Kamchatka Trench. Zool. Journ. 48 (5). In press (in Russian).

_____. New starfishes from abyssal and ultraabyssal depths of the Pacific Ocean. Bull. Moscow Soc. of Naturalists, Ser. Biol. In press (in Russian).

Blake, D.B. Pedicellariae of two silurian echinoids from Western England. Palaeontology. In press.

Boolootian, R.A. 1968. Review of Echinoderm Biology by N. Millott (ed.). Science 160 (3827): 523.

_____. Fundamental concepts of biology 2nd. ed. John Wiley and Sons Inc: New York. In press (with G.E. Nelson and G.G. Robinson)

Brower, J.C. 1968. Review of "New Permian crinoid fauna from Southern Nevada" by N.G. Lane and G.D. Webster. Journ. Paleontology 42: 245.

- Brower, J.C. (cont'd) Crinoid fauna of the Redwall Limestone. In: McKee and Gutschick: The Redwall Limestone. Geol. Soc. American Memoirs. In press.
- _____. Review of Treatise volume - Echinodermata part 5, Crinozoa. Journ. Paleontology (in press).
- Burke, J.J. 1968. Pachylocrinids from the Conemaugh group, Pennsylvanian. Kirtlandia No. 3, p. 1-18, figs. 1-4.
- Campbell, A.C. and M.S. Laverack. 1968. The responses of pedicellariae of Echinus esculentus. J. exp. mar. Biol. Ecol. Vol. 2, p. 191-214.
- Chaet, A.B. 1967. Gamete release and shedding substance of seastars. Symp. Zool. Soc. London (1967) No. 20, 13-24.
- _____. 1967. Microscopic observations of gamete-shedding substance. Trans. Amer. Microsc. Soc. 86 (2): 120-126.
- Chatlynne, L. A histochemical study of oogenesis in the sea urchin Strongylocentrotus purpuratus. Biol. Bull. In press.
- Chauvel, J. 1967. Presence du genre Destombesia Chauvel dans l'Ordovicien du Massif armoricain (Echinodermes Cystoides). C.R. som. Societe geol. de France, fasc. 3 p. III.
- Chesher, R.H. 1968. The systematics of sympatric species in West Indian spatangoids: a revision of the genera Brissopsis, Plethotaenia, Paleopneustes, and Saviniaster. Studies in Trop. Ocy. 7. Univ. of Miami Press, 168 pp, 34 pls., 24 figs.
- _____. Lytechinus williamsi, a new echinoid from Panama. Breviora. In press.
- _____. The ecology of Meoma ventricosa (Spatangoida). Bull. Mar. Sci. In press.
- Chia, F.S. 1968. Some observations on the development and cyclic changes of the oocytes of a brooding starfish, Leptasterias hexactis. J. of Zool. (London) 154: 453-461.
- _____. 1968. The embryology of a brooding starfish, Leptasterias hexactis. Acta Zoologica, 49: 321-364.
- _____. 1968. Echinoderms: An autoradiographic study of assimilation of dissolved organic molecules. Science 161: 1153-1155. (with A.R. Fontaine)

Chia, F.S. (cont'd) Histology of the pyloric caeca and its changes during brooding and starvation in a starfish, Leptasterias hexactis. Biol. Bull. (in press).

_____. Histology of the pedicellariae of the Pacific sand dollar, Dendraster excentricus. J. Zool. (London) (in press).

_____ and J.B. Buchanan. Larval development of Cucumaria elongata (Echinodermata, Holothuriodea), J. Mar. Biol. Ass. U.K. (in press).

_____. Response of the globiferous pedicellariae to inorganic salts in three regular echinoids; Echinus esculentus, psammechinus miliaris and Strongylocentrotus drobachiensis. Ophelia (in press).

Clark, A.M. 1967. Notes on Asteroids in the British Museum (Natural History). V. Nardoa and some other Ophidiasterids. Bull. Br. Mus. nat. Hist. (Zool.) 15: 169-198, 6 pls.

_____. 1967. Echinoderms from the Red Sea, part 2. (Crinoids, Ophiuroids, Echinoids and more Asteroids). Bull. Sea Fish. Res. Haifa 41: 26-58, 5 figs.

_____. 1967. Notes on the family Ophiotrichidae (Ophiuroidea). Ann. Mag. nat. Hist. 9: 637-655, 2 pls.

_____. 1967. Variable symmetry in fissiparous Asterozoa. In Millott, N. (editor). Echinoderm Biology. Symp. zool. Soc. Lond. No. 20: 143-157, 1 fig.

_____. 1967. Proposal for stabilization of the name of some common european Ophiuroidea. Z.N. (S.) 1772. Bull. zool. Nomencl. 24: 41-48.

Clark, A.H. and Clark, A.M. 1967. A monograph of the existing crinoids. 1 (5). Suborder Oligophreata (concluded) and Macrophreata. Bull. U.S. natn. Mus. 82: x + 860 pp., 53 figs.

Clark, A.M. and Rowe, F.W.E. 1967. Proposal for stabilization of the name of certain genera and species of Holothuriodea. Z.N. (S.) 1782. Bull. zool. Nomencl. 24: 98-115.

_____. 1967. The identity of the species commonly known as Holothuria monacaria Lesson, 1830. Z.N. (S.) 1793. Bull. zool. Nomencl. 24: 126-128.

- Clark, A.M. 1967 (cont'd) Crinoids of the Zoological collection of the
Barvarian State. Veroff. Zool. Staatssamml. Munich 11: 151-174,
2 figs.
- _____ 1968. Note on an echinoid from Gough Island, South Atlantic.
Beaufortia 15 No. 186: 51-56.
- _____ 1968. Notes on some tropical Indo-Pacific ophiotrichids
and ophiodermatids (Ophiuroidea). Bull. Br. Mus. nat. Hist. (Zool.)
16: 277-322, 10 figs., 1 pl.
- _____ (in the press). Notes on the family Amphiuridae. Bull.
Br. Mus. nat. Hist. (Zool.)
- _____ (in the press). Monograph of shallow-water Indo-West Pacific
Echinoderms. London: Brit. Mus. (Nat. Hist.).
- Clark, H.E.S. Two new species of Benthopecten (Asteroidea) from New Zealand.
In press.
- Clark, J.F. The Stelleroidea of Easter Island? In press.
- Cobb, J.L.S. 1968. Observations on the electrical activity within the
retractor muscles of the lantern of Echinus esculentus using
extracellular recording electrodes. Comp. Biochem. Physiol. 24, 311.
- _____ 1968. The fine structure of the pedicellariae of Echinus
esculentus (L.) I. The innervation of the muscles. J. Roy. micr.
Soc. 88, 211.
- _____ 1968. The fine structure of the pedicellariae of Echinus
esculentus (L.) II. The sensory system. J. Roy. micr. Soc. 88,
223.
- _____ 1969. The distribution of mono-amines in the nervous system
of echinoderms. Comp. Biochem. Physiol. In press.
- Cocanour, B.A. 1967. The breeding cycles of a sand dollar and a sea urchin.
Comp. Biochem. Physiol., 20: 327-331.
- Crump, R.G. 1968. The flight response in Struthiolaria papulosa gigas
Sowerby, New Zealand, J. Mar. Freshw. Res. 2 (3): 390-397.
- Dartnall, A.J. 1967. New Zealand animals from Channel waters. Tasmanian
Fisheries Research.
- _____ 1968. Asterodiscus truncatus (Coleman, 1911), a new record
for Tasmanian waters. Proc. Roy. Soc. Tasmania.

Dartnall, A.J. (cont'd) 1969. A field key to the Tasmanian sea stars.
Tasmanian Fisheries Research 3 (1).

_____. A viviparous species of Patiriella (Asteroidea, Asterinidae)
from Tasmania. In press.

_____. New Zealand sea stars in Tasmania. In press.

Dayton, P.K. 1968. Feeding behavior of asteroids and escape responses of
their prey in the Puget Sound region. Ecology 49 (9).

_____. Benthic faunal zonation as a result of Anekor Ice at
McMurdo Sound, Antarctica. In: SCAR Symposium. London: Academic
Press. In press.

Dearborn, J.H. 1967. Stanford University invertebrate studies in the Ross
Sea, 1958-61: general account and station list. In: Bullivant J.S.
and J.H. Dearborn. The fauna of the Ross Sea. Part 5. General
accounts, station lists and benthic ecology. N.Z. Dep. sci. industr.
Res. Bull. 176: 31-47.

_____. Bottom-dwelling invertebrates of Antarctic seas. Australian
Natural History, special Antarctic issue.

_____ and J.A. Rommel. Crinoidea. Antarctic map folio series,
American Geographical Society, New York. In press.

Delavault, R. 1967. Les modalités de l'hermaphrodisme fonctionnel chez un
Echinoderme: Asterina gibbosa et chez un Insecte: Icerya purchasi.
C.R. Soc. Biol., 161, 13-16. (with J. Brusle et M. Royer)

_____ 1967. Le complexe axial d'Asterina gibbosa (Echinoderme,
Astéride) et ses rapports avec le complexe génital. Bull. Soc. Zool.
Fr., 92, 603-611. (with M. Leclerc)

_____ 1967. Recherches sur l'ultrastructure et la signification
des cellules folliculeuses ovocytaires chez Echinaster sepositus
(Echinoderme, Astéride). C.R. Soc. Biol., 161, 511-514. (with
A.M. Tangapregassom)

_____ 1967. Sur la présence de flagelles dans les diverses
catégories cellulaires observées en microscopie électronique dans
les gonades d'Asterina gibbosa (Echinoderme, Astéride). Bull. Soc.
Zool. Fr., 92, 488. (with J. Brusle)

_____ 1967. Données ultrastructurales sur les ovocytes en grand
accroissement chez Asterina gibbosa, Etoile de mer hermaphrodite.
C.R. Soc. Biol., 161, 2115-2117. (with J. Brusle)

Delavault, R. 1967 (cont'd). Recherches sur la cytodifférenciation des gamètes chez un hermaphrodite fonctionnel: Asterina gibbosa. I.- Ultrastructure des ovogonies et des ovocytes en préméiose. C.R. Acad. Sci., 266, 21-23 (par en 1968). (with J. Brusle)

_____ 1968. Recherches sur la cytodifférenciation des gamètes chez un hermaphrodite fonctionnel: Asterina gibbosa. II.- Ultrastructure des cellules de la lignée spermatogénétique et comparaison spermatogonies-ovogonies. C.R. Acad. Sci., 266, 710-712. (with J. Brusle)

_____ 1968. L'oeuf, la larve et la métamorphose d'une petite Etoile de mer: Asterina gibbosa. Science et Nature, n° 86, 28-31.

_____ 1968. Analyse expérimentale de la sexualité d'Asterina gibbosa, en particulier par les culture organotypiques. Communication au Colloque sur l'Embryologie expérimentale des Invertébrés, Clermont-Ferrand, 29-30 Avril. (with J. Brusle)

_____ 1968. A paraître dans: "Cours et documents de Biologie", sous la direction de E. Wolff, Membre de l'Institut, Gordon et Breach éd. Londres.

_____ 1968. Mise au point, en vue d'études histologiques, d'une méthode avec substitution ionique préalable permettant un ramollissement des tissus dur (Application aux Echinodermes et aux dents humaines). J. Micr. (with H. Lamendin et M. Leclerc)

_____ 1969. La sexualité d'Asterina pancerii Gasco (Echinoderme, Astéride) des Golfs de Naples et de Marseille. Pubbl. Staz. zool. Napoli, (sous presse). (with J. Brusle et G. Pierre)

Devaney, D.M. 1967. An ectocommensal polynoid associated with Indo-Pacific Echinoderma, primarily ophiuroids. B.P. Bishop Mus. Occ. Pap. 23 (13): 287-304.

Dix, T.G. Aggregating in the echinoid Evechinus chloroticus. Pacific Science. In press.

_____, Association between the clingfish Dellichythus morelandi Briggs and the echinoid Evechinus chloroticus Val. Pacific Science. In press.

_____, Larval life span in the echinoid Evechinus chloroticus. N.Z. Jl. Mar. Freshw. Res. In press.

Domantay, J.S. The echinoderm fauna of Manila Bay. Philippine Journ. Sic. In press. (with P. Conlu)

- Downey, M.E. 1968. A note on the Atlantic species of the starfish genus Linckia. Proc. Biol. Soc. Washington 81, 41-44.
- _____, 1968. Catalog of Recent echinoid type specimens in the U.S. National Museum, Smithsonian Institution and the Museum of Comparative Zoology, Harvard University. U.S. National Museum Bull. 264, 99 pp.
- _____, 1968. Sea-stars of North Carolina. U.S. Fish and Wildlife Fishery Bull. vol. 67 (1): 127-163. (with I.E. Gray and M.J. Cerrame-Vivas).
- _____, Catalog of Recent ophiuroid type specimens in major collections in the United States. U.S. National Museum Bulletin. In press.
- Duluk, C.E. Some crinoids common to Oklahoma and Michigan. In press (with H.L. Strimple).
- _____. Biostratigraphy and ecology of a Paint Creek echinoderm fauna. In press. (with H.L. Strimple).
- Durham, J.W. 1967. Lepidocystoids, camptostromatoids. In: Treatise on Invertebrate Paleontology, R.C. Moore (ed.), part S.
- _____. Echinoid section of Morris and Abbott, California intertidal marine invertebrates. In press. (with C.W. Allison).
- Ebert, T.A. 1968. Growth rates of the sea urchin Strongylocentrotus purpuratus related to food availability and spine abrasion. Ecology 49 (6): 1075-1091.
- Ernest, R.G. Systematics and ecology of echinoderms in Tampa Bay, Florida. In press.
- Farmanfarmaian, A., 1968. The controversial echinoid heart... Comp. Biochem. Physiol. 24: 855-863.
- _____. 1967. Regeneration of the axial organ of Arbacia... Nature 216: 1136-1138.
- _____. Intestinal absorption and transport in Thyone I and II (in preparation).
- Fay, Robert O. 1968. Treatise on Invertebrate Paleontology, Moore, ed.-part S. Echinodermata; Blastoids.
- Fechter, Hubert. Excretion in Paracentrotus lividus. (In press).
- _____. Water exchange in Echinus esculentus. (In press).

Feder, H., 1967 Studies on a sea-star (Marthasterias glacialis) extract responsible for avoidance reactions in a gastropod (Buccinum undatum). Arkiv. for Zoologi. Ser. 2. 19: 369-379.

_____ Organisms responsive to predatory sea stars. Sarsia, 29: 371-394.

_____ 1968. Ossicles in the stomach wall of Ophiura texturata Lamarck (Echinodermata, Ophiuroidea). Ophelia, 5: 215-220. (with B. Larsson).

Fell, Julian. Echinoidea of Easter Island. (In press).

Fontaine, A.R. 1968. Echinoderms: an autoradiographic study of assimilation of dissolved organic molecules. Science, 161: 1153-1155. (with F.S. Chia).

_____ Pigmented tumor-like lesions in an ophiuroid echinoderm. J. Nat. Cancer Inst. (In press).

_____ A new ophiuroid host for Rhopalura ophiocomae Giard (Orthonectida: Mesozoa). J. Parasit. (In press).

Fuji, Akira. Ecological studies on the growth and food consumption of Japanese common littoral sea urchin Strongylocentrotus intermedius (Agassiz).

_____ Biological studies on the sea urchin and its fisheries in North Japan. (In press).

Geiger, Stephen R. Distribution of the ophiuroid larva Ophiopluteus ramosus. In press.

_____ Distribution and abundance of echinoderm larvae in the North Sea. (In press).

Giese, Arthur C. Respiratory rate of sea urchin body components in relation to sex, size, nutrition and season. (In press).

Gray, I.E. 1968. Observations on the biology of the sand dollar Mellita quinquiesperforata (Leske). J. Elisha Mitchell Sci. Soc. 84: 315-327. (with Starr Culver Weihe).

_____ 1968. Sea-stars of North Carolina. U.S. Fish and Wildlife Fisheries Bull. 67: 127-163. (with Maureen E. Downey and M.J. Cerame-Vivas).

_____ 1968. The commensal crab Dissodactylus mellitae and its reaction to sand dollar host factor. J. Elisha Mitchell Sci. Soc. 84 (4): 471-481. (with L.R. McCloskey and Starr Culver Weihe).

Guille, Alain, 1967. Complement a la faune des Echinodermes de la mer de Banyuls. Vie Milieu 28: 317-330. (with G. Cherbonnier)

_____. 1967. Sur la presence, a Banyuls, de l'holothurie apode, Labidoplax buski (M'Intosh). Bull. Mus. Nat. Hist. Nat. 39 (5): 1219-1223. (with G. Cherbonnier)

_____. Sur une nouvelle Holothurie Dendrochirote de Mediterranee: Phyllophorus drachi, nov. sp. Bull. Mus. Nat. Hist. Nat. In press. (with G. Cherbonnier)

_____. Sur la presence d'Ophiactis savignyi Muller et Troschel dans la region de Banyuls-sur-Mer. Vie Milieu (in press).

Halpern, Jerald, 1968. Biological investigations of the deep sea. 38. A new western Atlantic Dipsacaster (Echinodermata, Asteroidea) with the distribution of known species. Proc. Biol. Soc. Wash., 81: 231-240.

_____. Biological investigations of the deep sea. The genus Litonotaster (Echinodermata, Asteroidea). Proc. Biol. Soc. Wash. In press.

_____. Biological investigations of the deep sea. Goniasteridae (Asteroidea, Echinodermata) of the Straits of Florida. Bull. Mar. Sci. In press.

Hansen, Bent, 1967. The taxonomy and zoogeography of the deep-sea holothurians in their evolutionary aspects. Studies in tropical Oceanography, nr. 5, pp. 480-501.

_____. 1968. Brood-protection in a deep-sea holothurian, Oneirophanta mutabilis Theel. Nature, vol. 217, no. 5133, pp. 1062-1063.

Hess, Hans. Ein neuer Seestern (Pentasteria longispina n. sp.) aus den Effingerschichten des Weissensteins (Kt. Solothurn). Eclogae geol. Helv. 61/2. In press.

Irimura, Seiichi, 1968. A new species of Ophiuroidea from the coast of Kii peninsula, Japan. Publ. Seto Mar. Biol. Lab., vol. XV, no. 5.

_____. 1968. Ophiuroidea collected from around the Ross Sea in 1964, with description of a new species. Journ. Tokyo Univ. Fish., vol. 9, no. 2.

_____. 1968. Ophiuroidea collected by the Umitaka-Maru, off Prince Harald Coast, Antarctica in 1957. Journ. Tokyo Univ. Fish., vol. 55, no. 1.

Jefferies, R.P.S., 1968. The subphylum Calcichordata (Jefferies, 1967). Primitive fossil chordates with echinoderms affinities. Bull. Br. Mus. nat Hist. (Geol.), 16 (6).

Ceratocystis perneri Jaekel - a Middle Cambrian chordate. Palaeontology (in press).

Kanatani, Haruo, 1967. Neural substance responsible for maturation of oocytes and shedding of gametes in starfish. Gunma Symposia on Endocrinology 4: 65-78.

1967. In vitro production of meiosis inducing substance by nerve extract in ovary of starfish. Nature, 216: 284-286. (with H. Shikii)

1967. Starfish gonad: Action and chemical identification of spawning inhibitor. Science 158: 1052-1053. (with S. Ikegami, S. Tamura)

1967. Mechanism of starfish spawning with special reference to gonad-stimulating substance (GSS) of nerve and meiosis-inducing substance (MIS) of gonad. Jap. J. exp. Morphol. 21: 61-78.

Mechanism of starfish spawning: Action of neural substance on the isolated ovary. Gen. Comp. Endocrinol. Suppl. 2.

1968. Problems concerning the participation of a pheromone in starfish spawning. Zool. Mag. (Tokyo) 77: 207-212. (with H. Shirai)

1969. Isolation and identification of meiosis inducing substance in starfish Asterias amurensis. Nature 211: 273-274. (with H. Shirai, K. Nakanishi and T. Karokawa)

Kenny, R., 1967. The growth of Arachnoides placenta (L) (Echinoidea). Pacific Science 21: 230-235.

Growth and asexual reproduction of the starfish Nepanthia belcheri (Perrier). Pacific Science. In press.

Kesling, Robert V., 1967. Edrioasteroid with unique shape for Mississippian strata of Alberta. J. Paleontology, v. 41, no. 1, pp. 197-202.

1967. Cystoids: Treatise on Invertebrate Paleontology, pt. S, Echinodermatal, vol. 1, p. 85-267.

Paracrinoids: *ibid.*, p. 268-288.

Kesling, Robert V., (cont'd) 1968. New species of Porocrinidae and brief remarks upon these unusual crinoids. Contrib. Mus. Paleontology Univ. Mich., v. 22, no. 1, p. 1-32. (with C.R.C. Paul)

_____ 1968. Review of Jean Chauvel, Echinodermes de l'Ordovicien du Maroc. J. Paleontology, v. 42, no. 1, p. 245-247. (with C.R.C. Paul)

_____ New ophiuroid from Chester Series (Mississippian) of Illinois. *ibid.*, p. 197-200, (with P.R. Bjork and P.S. Goldberg).

_____ 1968. Mouth frame of the ophiuroid Onychaster. Contrib. Mus. Paleontology Univ. Mich., v. 22, no. 4, p. 45-60. (with P.R. Bjork and P.S. Goldberg).

_____ 1968. Gennaeocrinus chilmanae, a new crinoid from the Middle Devonian Silica Formation in southeastern Michigan. *ibid.*, no. 8, p. 133-138.

_____ 1968. Notes on ontogeny of the Middle Devonian crinoid Proctothylacocrinus esseri Kesling. *ibid.*, no. 9, p. 133-138

_____ 1968. Ameliacrinus benderi, a new dicyclic camerate crinoid from the Middle Devonian Silica Formation in northwestern Ohio. *ibid.*, no. 11, p. 155-162.

_____ 1968. Logocrinus conicus, a simple new Middle Devonian inadunate crinoid from Michigan. *ibid.*, no. 12, p. 163-167.

_____ 1968. Cystoids, blastoids, and edrioasteroids. In Moore, R.C., et al., Developments, trends, and outlooks in paleontology. J. Paleontology, v. 42, no. 6, p. 1370-1371. (with D.B. Macurda and C.R.C. Paul)

_____ 1969. Two new crinoids from the Middle Devonian Silica Formation. Contrib. Mus. Paleontology Univ. Mich., v. 22, no. 15, p. 199-206.

_____ 1969. Silicaster, a new genus of Devonian starfish. *ibid.*, no. 19, p. 249-261.

_____ Three Permian starfish from Western Australia and their bearing on revision of the Asteroides. In press.

_____ Cunctocrinus, a new Middle Devonian calceocrinid crinoid from the Silica Shale of Ohio. In press. (with James P. Sigler)

_____ A new brittle-star from the Middle Devonian Arkona Shale of Ontario. In press.

_____ Drepanaster wrighti, a new brittle-star from the Middle Devonian Arkona Shale of Ontario. In press.

Kier, Porter M., 1968. Nortonechinus and the Ancestry of the Cidarid Echinoids. J. Paleontology, v. 42, pp. 1163-1170.

_____ 1968. The Triassic echinoids of North America. J. Paleontology, v. 42, pp. 1000-1006.

_____ 1968. Echinoids from the Middle Eocene Lake City Formation of Georgia. Smithsonian Misc. Coll., v. 153, no. 2, 45 pp.

_____ A Cretaceous echinoid with false teeth. In press.

_____ Sexual dimorphism in echinoids. In press.

Kobayashi, Naomasa, 1967. Spawning periodicity of sea urchins at Seto. I. Mespilia globulus. Publ. Seto Marine Biol. Lab. 14: 403-414.

_____ 1967. Spawning periodicity of sea urchins at Seto. II. Diadema setosum. Publ. Seto Marine Biol. Lab. 15: 173-184. (with Kenji Nakamura)

_____ Spawning Periodicity of sea urchins at Seto. III. Tripneustes gratilla, Echinometra mathaei, Anthocidaris crassispina and Echinostrephus aciculatus. In press.

Krishnan, S., 1967. A report on the reproductive cycle of the holothurian Holothuria scabra Jager. Curr. Sci., 36: 155-156.

_____ 1967. Biochemical and cytochemical observations of the nucleic acids in the gonads of Holothuria scabra Jager. Acta Biol. et Med. Soc. Gedan, 11: 307-313.

_____ 1968. Histochemical studies of the reproductive and nutritional cycles of the holothurian Holothuria scabra. Marine Biology 2: 54-65.

_____ Reproductive cycles and changes in the organic constituents in different tissues of the holothurian Holothuria scabra Jager. Paper presented in "Symposium on Recent Trends in Animal Physiology", University of Gorakhpur, Uttar Pradesh, India.

Kyte, Michael A. A synopsis and key of the recent Ophiuroidea: I. Washington and southern British Columbia (in preparation).

Landenberger, D. Predatory behavior in starfish. In press.

_____ Effect of exposure to air on starfish. In press.

Lane, N. Gary. Two new Devonian crinoids from Nevada. In press. (with J.G. Johnson)

_____ A crinoid from the Pennsylvania Essex fauna of Illinois.
In press.

_____ Carboniferous echinoderms from the Southwestern United States. In press. (with G.D. Webster)

Laverack, M.S., 1967. Neuromuscular systems in echinoderms. Symp. Zoo. Soc. London 20: 25-51. (with J.L.S. Cobb)

_____ The responses of pedicellariae from Echinus esculentus (L.).
In press.

_____ The statocysts of various invertebrates. Proceedings of a conference on Gravity and the organism, Tuxedo, New York. In press.

Lawrence, John M. Lipid reserves in the gut of three species of tropical sea urchins. Carib. J. Sci. 7: 65.

Lima Verde, Jose Santiago. Observacoes sobre as especies de Cassidulus (Cassiduloida, Echinoidea) do Brasil. In press. (with Tommasi)

_____ Sobre alguns equinodermas do Estado do Ceara. In press
(with Tommasi)

_____ Notas sobre a familia Toxopneustidae no nordeste brasileiro (Echinodermata: Echinoidea) In press

_____ On the occurrence of Chiridota peloria Deichmann, 1930 off the coast of Brasil (Echinodermata: Holothurioidea). In press.

McKellar, Rodney G. Permian pelmatozoan echinoderms from the Rockhampton District, Queensland. Geol. Surv. of Queensland, Publ. 337, (In press).

Macurda, Donald B., 1968. New Lower Devonian blastoids from Bohemia. Kon. Ned. Akad. Wet., Amsterdam, Proc. Ser. B., v. 71, no. 2, p. 124-136. (with A. Breimer and R.J. Prokop)

_____ 1968. A new blastoid fauna from the lower Namurian of North Kazakhstan, USSR, ibid., no. 3: 159-174. (with Y.A. Arendt and A. Breimer)

_____ Ontogeny of the crinoid Eucalyptocrinites, in Paleobiological aspects of growth and development, a symposium: Paleont. Soc., Mem. 2. J. Paleontology, v. 42, no. 5, suppl. 1, p. 99-118.

- Macurda, Donald B. (cont'd). Blastoids, in McKee, E.D. and Gutschick, R.C., "The history of the Redwall Limestone of northern Arizona", Geol. Soc. America, Mem. In press.
- Mauzey, Karl P., 1968. Feeding behavior of asteroids and escape responses of their prey in the Puget Sound region. Ecol. 49 (4): 603-619. (with C. Birkeland and P.K. Dayton)
- Mileikovsky, Simon A., 1967. Permanent mass shoals and temporary mass aggregations of marine freemoving shallow shelf bottom invertebrates and their biological significance. Okeanologija, v. 7, no. 4, pp. 655-664.
- _____. 1968. Breeding of the starfish Asterias rubens L. in the White, Barents, Norwegian and other European seas. Okeanologija, v. 3, no. 4, pp. 693-704.
- _____. 1968. Distribution of pelagic larvae of bottom invertebrates of the Norwegian and Barents Seas. Marine Biology, v. 1, no. 3, pp. 161-167.
- _____. 1968. Some common features in the drift of pelagic larvae and juvenile stages of bottom invertebrates with marine currents in temperate regions. Sarsia, no. 34, pp. 209-216.
- Mintz, Leigh W. Echinoids of the Mesozoic families Collyritidae d'Orbigny, 1853 and Disasteridae Gras, 1848. J. Paleontology, v. 42, no. 5, pp. 1272-1288.
- Patent, Dorothy. The reproductive cycle of Gorgonocephalus caryi. In press.
- Paul, C.R.C. 1967a. The British Silurian Cystoids. Bull. Brit. Mus. Nat. Hist. vol. 13, pp. 299-355, 10 pls.
- _____. 1967b. A redescription of the cystoid Lipsanocysis traversensis Ehlers and Leighley (Rhombifera: Callocystitidae). Contr. Mus. Paleont. Univ. Mich. vol. 21, pp. 205-217, 2 pls.
- _____. 1967c. Hallicystis attenuata, a new callocystitid cystoid from the Racine Dolomite of Wisconsin. Contr. Mus. Paleont. Univ. Mich. vol. 21, pp. 231-253, 4 pls.
- _____. 1967d. Osculocystis, a new British Silurian Cystoid. Geol. Mag. vol. 104, pp. 449-454, pl. 21.
- _____. 1967e. Cyclocystoidea, Eocrinoidea, Rhombifera, Diploporita and Paracrinoidea. In The Fossil Record. (W.B. Harland et al. Editors) pp. 566-570.

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Paul, C.R.C. (cont'd) 1967f. Cystidea Barrande 1868 (Cystoidea: Glyptocystitida): proposed suppression under the plenary powers Z.N. (S.) 1813. Bull. Zool. Nomen. vol. 24, pp. 304-307.

_____ 1967g. The functional morphology and mode of life of the cystoid Pleurocystites, E. Billings, 1854. Symp. Zool. Soc. Lond. vol. 20, pp. 105-123.

_____ 1967h. New Ordovician Bothriocidaridae from Girvan and a reinterpretation of Bothriocidaris Eichwald. Paleontology vol. 10, pp. 525-541, pls. 84-85.

_____ 1968a. New species of Porocrinidae and brief remarks upon these unusual crinoids. Contr. Mus. Paleont. Univ. Mich. vol. 22, pp. 1-32, pls. 1-8. (with R.V. Kesling)

_____ 1968b. Notes on cystoids. Geol. Mag. vol. 105, pp. 413-420, pl. 14.

_____ 1968c. Macrocystella Callaway, the earliest glyptocystitid cystoid. Paleontology vol. 11, pp. 580-600, pls. 111-113.

_____ 1968c. Cystoidea, Blastoidea and Edrioasteroidea. In Developments, trends, and outlooks in Paleontology (R.C. Moore et al.) J. Paleont. vol. 42, pp. 1370-1371. (with D.B. Macurda and R.V. Kesling)

_____ 1968d. Morphology and function of dichopore pore-structures in cystoids. Palaeontology vol. 11, pp. 697-370, pls. 134-140.

Pawson, D.L. 1967. The psolid holothurian genus Lissothuria. Proc. U.S. Nat. Mus. 122 (3592), 1-17, 4 pls.

_____ 1967. Protankyra grayi new species and Labidoplax buskii (McIntosh) from North Carolina (Holothuroidea: Synaptidae). Proc. Biol. Soc. Washington 80, 151-156, 10 figs.

_____ 1967. Redescription of Cucumaria semperi Bell, an Indo-west-Pacific holothurian echinoderm. Ibid., 157-162, 10 figs.

_____ 1967. A new genus in the holothurian family Synaptidae, with a new species from Tasmania. Pap. Proc. R. Soc. Tasmania 101, 31-35, 15 figs. (with F.W.E. Rowe)

_____ 1968. The Echinozoan fauna of the New Zealand Subantarctic Islands, Macquarie Island and the Chatham Rise. N.Z. Dept. Sci. Industr. Res. Bull. 187: 1-35.

_____ 1968. Some holothurians from Macquarie Island. Trans. R. Soc. N.Z. (Zool) 10 (15): 141-150.

Pawson, D.L. (cont'd) The marine fauna of New Zealand: sea cucumbers (Echinodermata: Holothuroidea). In press.

____ Antarctic echinoderms. In: Australian Natural History. In press.

____ Antarctic Holothurians. In: American Geographical Society Map Folio Series - Antarctic Invertebrates. In press.

____ Antarctic echinoids. *ibid.* In press.

____ Reports of the Lund University Chile Expedition 1948-9. Holothuroidea. *Sarsia*. In press.

____ Astrothrombus rugosus Clark, new to New Zealand, with notes on Ophioceres huttoni (Farquhar), Hemilepis norae (Benham) and Ophiuroglypha irrorate (Lyman). (Echinodermata: Ophiuroidea). In press.

____ Replacement name for the preoccupied genus name Odinia Pertier, 1885. In press. (with E.C. Pope, A. Dartnall, B. Smith)

Pearse, J.S. Slow developing demersal embryos and larvae of the antarctic sea star Odontaster validus. *Marine Biology*. In press.

____ The common antarctic sea star Odontaster validus. *Australian Natural History*. In press.

____ Patterns of reproduction in four species of Indo-Pacific echinoderms. *Proc. Indian Acad. Sci., B*. In press.

____ Continuous reproduction in the Indo-Pacific sea urchin Echinometra mathaei at Rottnest Island, Western Australia. *Australian J. Mar. Freshw. Res.* In press. (with B.F. Phillips)

____ Reproductive periodicities of Indo-Pacific invertebrates in the Gulf of Suez. I. The echinoids Prionocidaris baculosa (Lamarck) and Lovenia elongata (Gray). *Bull. Mar. Sci.*, in press.

____ Reproductive periodicities of Indo-Pacific invertebrates in the Gulf of Suez. II. The echinoid Echinometra mathaei (de Blainville). *Bull. Mar. Sci.* In press.

____ Reproductive periodicities of Indo-Pacific invertebrates in the Gulf of Suez. III. The echinoid Diadema setosum (Leske). *Bull. Mar. Sci.* In press.

____ Notes on the aggregation behavior of Diadema (Echinodermata: Echinoidea). *Micronesica*. In press. (with S.W. Arch)

- Philip, G. M. Tertiary echinoids of S.E. Australia, pt. IV. In press.
- Pope, Elizabeth C., 1967. Lesser known echinoderms of the Great Barrier Reef. Australian Natural History, pp. 310-34.
- Prokop, Rudolf J., 1967. Some manners of attachment of crinoids in the Lower Devonian beds at Koneprusy in Bohemia. Vest. Linc., 5: 367-368.
- _____. New Lower Devonian blastoids from Bohemia. Konnk. Neder. Akad. Wesen. Proc. B-71, no. 2: 124-136. (with Breimer, Macurda)
- _____. The family Calceocrinidae Meek and Worthen, 1869 in Bohemian Silurian and Devonian. p. 1-157 (unpublished).
- _____. Crinoidea of the Reefton Group (Lower Devonian), New Zealand. In press.
- _____. The family Calceocrinidae Meek and Worthen, 1869 in Bohemian Silurian and Devonian. In press.
- Robison, Richard A., 1969. A new echinoderm from the Middle Cambrian of Utah. Geol. Soc. America Abstracts for 1969, pt. 5, p. 69. (with J. Sprinkle)
- Rommel, Janis A. Crinoidea. Amer. Geog. Soc. Ant. Folio Ser. Invertebrate Folio. (with J. Dearborn)
- Schoener, Amy, 1968. Evidence for reproductive periodicity in the deep sea. Ecology 49: 81-87.
- _____. Atlantic ophiuroids: some post-larval forms. In press.
- Serafy, Donald Keith. A new species of Clypeaster from the Gulf and Caribbean with a key to the species in the tropical western Atlantic. In press.
- Shepherd, Scoresby A., 1968. Echinoderms of South Australia. Pt. I. The Asteroids. Rec. S.A. Museum: 15.
- Santos, Helena de Souza, 1968. Morphological and histochemical studies on the secretory glands of starfish tube feet. Acta Anat. 69: 41-51.
- _____. Electron microscopic observations on the external epithelium of a starfish tube feet. In press.
- Stephenson, D.G., 1968. An aberrant species of Fibularia from Kenya and Madagascar. Geol. Mag., vol. 105, no. 2, pp. 136-139.
- _____. 1968. Some Miocene Cidaridae (Echinoidea) from Kenya. J. Nat. Hist., vol. 2, pp. 553-568.

Strathmann, Richard. Increased germinal vesicle breakdown in sea cucumber eggs treated with starfish radial nerve extract. In press.

Strimple, H.L. Paracromyocrinus marquisi from the Savanna Formation, Oklahoma: Okla. Geol. Survey, Okla. Geol. Notes, v. 28, (1), p. 33-36, 2 figs.

_____ Biostratigraphy of the Atokan Stage (Abstract): Okla. Geol. Survey, Okla. Geol. Notes, v. 28, p. 118. (also in Geol. Soc. Amer. Proceedings.)

_____ A new edrioasteroid: Iowa Acad. Sci., Proc., v. 73, p. 260-262, 4 figs.

_____ and Strimple, Melba L., Pennsylvanian Synbathocrinus from Oklahoma: Okla. Geol. Survey, Okla. Geol. Notes, v. 28 (5), p. 172-173, 1 fig.

_____ and Koch, D.L., A new Upper Devonian cystoid attached to a discontinuity surface; Iowa Geol. Survey, Report of Investigations 5, 49 p., 9 pl., 9 text-figs.

_____ Review of University of Kansas Paleontological Contributions, Articles 8-10 in Jour. Paleont., v. 42, (6), p. 1487-1488.

_____ and Levorson, C.O., Upper Devonian crinoids of Iowa (at KU press), A redescription of two crinoid species described by Belanski.

_____ and _____ Catalogue of the Belanski Collection [echinoderms included] (at Bull. Amer. Paleontology).

_____ and Watkins, W.T., Carboniferous Crinoids of Texas and Stratigraphic Implications. (Scheduled for April release-Palaentographica Americana).

_____ and McGinnis, Mike, A new Crinoid from the Gilmore City Formation (at KU press).

Burdick, D.W. and Strimple, H.L. Revision of some Chesterian Inadunate Crinoids (scheduled for March release, Paleontological Contributions, KU press).

Moore, R.C. and Strimple, H.L. Explosive Evolutionary differentiation of Unique Group of Mississippian-Pennsylvanian Crinoids (Acrocrinidae), (scheduled for March release, KU press).

Sugiyama, Masao, 1969. Enhancement of respiration in the sea urchin egg by a subthreshold stimulation with an activating reagent. *Embryologia*, v. 10: 318-322.

_____. 1969. Ultrastructural changes in the surface of the oocyte during oogenesis of the sea urchin, Hemicentrotus pulcherrimus. *Embryologia*, vol. 10: 343-355.

_____. Propagation of the fertilization-wave on the once-activated surface of the sea urchin egg. *Embryologia*, vol. 10: 356-362.

Szymanska, W. 1967. Sur un caractère archaïque chez les Echinides irréguliers. *C.R. Acad. Sc. Paris*, t. 264, p. 2982-2986.

_____. 1968. Irregular echinoids - an insufficiently known group. *LETHAIA*, v. 1, No. 1, p. 50-62.

Takahashi, Keiichi, 1967. The catch apparatus of the sea urchin spine I. Gross histology. *J. Fac. Sci., Univ. Tokyo*, IV, 11: 109-120.

_____. 1967. The catch apparatus of the sea urchin spine II. Responses to stimuli. *ibid.*, 121-130.

_____. 1967. The ball-and-socket joint of the sea urchin spine: Geometry and its functional implications. *ibid.*, 131-135.

Termier, Genevieve. Les Stromatocystitoids et leur descendance, Essai sur l'évolution de premiers Echinodermes (in press).

Tommasi, Luiz Roberto, 1967. Ophiuroidea de la Côte d'Ivoire. *Bull. I.F.A.N.*, v. 29, no. 2: 521-583.

_____. 1967. Sobre dois Amphiuridae de fauna marinha do sul do Brasil. *Contr. Av. Inst. Ocean. USP, Oc. Biol.* no. 12.

_____. 1967. Observações preliminares sobre a fauna dos sedimentos moles da Baía de Santos e regiões vizinhas. *Bolm. Inst. Oceanogr. USP*, vol. 16 (1), pp. 43-65.

_____. 1968. Ophiuroides do Museu de Historia Natural de Buenos Aires coletados até 40 S. *Pap. Av. Dep. Zool. Secret. Agr. SP*, vol. 21 (11), pp. 115-124.

_____. Lista dos Asteroides recentes do Brasil. In press.

_____. Os Ophiuroidea recentes do Brasil. In press.

_____. Sobre alguns equinodermas do Estado do Ceará. In press.

_____. Observações sobre as espécies de *Cassidulus* (Cassiduloida, Echinoidea) do Brasil. In press.

Ubaghs, Georges Jean Charles, 1967. La genre Ceratocystis Yoskel (Echinodermata, Stylophora). Univ. Kansas Paleont. Contrib., 22.

_____ 1968. General Characters of Echinodermata - Eocrinoidea - Stylophora - Homostelea - Cymbionites and Peridionites, Unclassified Cambrian Echinoderms: Treatise on Invertebrate Paleontology, Pt. S.

_____ Crinoids, in "Developments, Trends, and outlooks in Paleontology. In press.

_____ General Characteristics of the Echinoderms. In press.

Utinomi, Huzio, 1968. A revised catalogue of crinoids collected from Japanese waters. Proc. Jap. Soc. syst. Zool., no. 4: 46-63. (with I. Kogo)

Weber, Jon - about 30 titles since 1967, on ultrastructure, chemistry, and physical and mechanical properties of skeletal calcite - please write for computer printout of titles.

Webster, G.D. Carboniferous echinoderms from the southwestern United States (with N. Gary Lane) In press.

_____ Stephanocrinus angulatus Conrad from the Nanberg beds of Kashmir (with V.J. Gupta) In press.

Wolleben, James A., 1967. Functional Morphology and Behavior of Scutellid Echinoids. Read at National Mtg., Geol. Soc. Amer.

Yoshida, Masao, 1968. The phototactic behavior of the starfish Asterias amurensis Lutken. Biol. Bull. 134: 516-532.

Zammit-Maempel, George, 1969. A new species of Coelopleurus (Echinoidea) from the Miocene of Malta. Palaeontology 12 (1): 42-47.

Zavodnik, D. 1967. Adriatic echinoderms inhabiting the phytal. Thalassia jugosl. 3: 11-22.

_____ 1969. Les Echinodermes de la Mer Adriatique sont-ils suffisamment connus? Ibid. 5 (In press).

DIRECTORY OF ECHINODERM SPECIALISTS

The list below is undoubtedly incomplete; as new names become available they will be included in addendum sheets in succeeding newsletters. A complete new directory will be compiled periodically. Where information has been sent to us, we have entered below the interests of specialists.

Abbreviations: Taxonomic - Ast., Asteroidea; Blast., Blastoidea; Carp., Carpoidea; Crin., Crinoidea; Cyst., Cystoidea; Ech., Echinoidea; Edrio., Edrioasteroidea; Eocrin., Eocrinoidea; Helico., Helicoplacoidea; Holo., Holothuroidea; Mach., Machaeridia; Oph., Ophiuroidea.

Field - bioch., biochemistry, cryst., crystallography; dev., development; ec., ecology; emb., embryology; gen., genetics; hist., histology; morph., morphology; pal., paleontology; phyl., phylogeny; phys., physiology; pop., population dynamics; sys., systematics; tax., taxonomy; zoog., zoogeography.

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